

Trophic Status of Impoundments

Eutrophication is a process of nutrient enrichment of a system and it is used to classify the stage at which this process is at any given time in a particular water body. The ‘trophic status’ of the water body is thus used as a description of the water quality status of water body, regarding the nutrient enrichment. The following classification terms are used and colour coding are applied for easy reading.

- Oligotrophic** – low in nutrients and not productive in terms of aquatic animal and plant life.
- Mesotrophic** – intermediate levels of nutrients, fairly productive in terms of aquatic animal and plant life and showing emerging signs of water quality problems.
- Eutrophic** – rich in nutrients, very productive in terms of aquatic animal and plant life and showing increasing signs of water quality problems.
- Hypertrophic** – very high nutrient concentrations where plant growth is determined by physical factors. Water quality problems are serious and can be continuous.

Table 1. Method to determine trophic status statistics:

Statistic	Unit	Current trophic status:			
		Mean annual chlorophyll <i>a</i>	µg/l	0<x≤10	10<x≤20
		Oligotrophic (low)	Mesotrophic (moderate)	Eutrophic (significant)	Hypertrophic (serious)
Current nuisance value of algal bloom productivity:					
% of time chlorophyll <i>a</i> > 30µg/l	%	0	0<x≤8	8<x≤50	>50
		negligible	moderate	significant	serious
Potential for algal and plant productivity:					
Mean annual Total phosphorus	mg/ l	x≤0.015	0.015<x≤0.047	0.047<x≤0.130	>0.130
		negligible	moderate	significant	serious

Table 2. The Trophic Status classification of South African impoundments determined for the period October 2002 to September 2003. Only dams that have been monitored for eutrophication purposes are reported on.

Dam Name	Mean TP mg/L	n TP	Mean Annual Chlorophyll <i>a</i> (µg/l)	n Chl	Percent of time Chl <i>a</i> > 30 µg/l	Trophic status
Albasini	0.014	2	1.6	2	0	Oligotrophic , Negligible potential and current algal productivity
Albert Falls	0.030	26	9.9	26	8	Oligotrophic , Moderate potential and current algal productivity
Allemanskraal	0.083	3	1.5	4	0	Oligotrophic , Significant potential and negligible current algal productivity
Bloemhof	0.114	42	63.6	19	30	Hypertrophic , Significant potential and current algal productivity
Boegoeberg	0.216	17	6.1	17	0	Oligotrophic , Serious potential and negligible current algal productivity
Bon Accord	0.630	20	326.7	21	93	Hypertrophic , Serious potential and current algal productivity
Boskop	0.048	42	1	14	0	Oligotrophic , Significant potential and negligible current algal productivity
Bospoort	0.791	9	4123	10	75	Hypertrophic , Serious potential and current algal productivity
Bronkhorstspuit	0.074	44	35.9	22	47	Hypertrophic , Significant potential and current algal productivity
Buffelspoort	0.028	5	5.0	3	0	Oligotrophic , Moderate potential and negligible current algal productivity
Cooks Lake	0.345	4	20.8	3	42	Eutrophic , Serious potential and significant current algal productivity
Disaneng	0.044	46	3.9	5	0	Oligotrophic , Moderate potential and negligible current algal productivity
Douglas Barrage	0.051	39	8.5	7	19	Oligotrophic , Significant potential and current algal productivity
Driekloof	0.043	7	-	-	-	Moderate potential for algal productivity
Driekoppies	-	-	2.7	9	0	Oligotrophic , Negligible current algal productivity
EJ Smith	0.041	10	17.7	12	17	Mesotrophic , Moderate potential and significant current algal productivity
Erfenis	0.289	1	2.3	1	0	Oligotrophic , Serious potential and negligible current algal productivity
Gariep	0.049	17	1.6	15	0	Oligotrophic , Significant potential and negligible current algal productivity
Grootdraai	0.063	12	8.4	6	15	Oligotrophic , Significant potential and current algal productivity
Gubu	0.020	7	-	-	-	Moderate potential for algal productivity
Hartbeespoort	0.254	109	167.1	106	47	Hypertrophic , Serious potential and significant current algal productivity
Hazelmere	0.033	17	3.1	26	0	Oligotrophic , Moderate potential and negligible current algal productivity
Henkries	0.038	6	11.9	17	14	Mesotrophic , Moderate potential and significant current algal productivity
Henley	0.004	26	4.4	26	0	Oligotrophic , Negligible potential and current algal productivity

Dam Name	Mean TP mg/L	n TP	Mean Annual Chlorophyll <i>a</i> (µg/l)	n Chl	Percent of time Chl <i>a</i> > 30 µg/l	Trophic status
Inanda	0.024	28	3.7	28	0	Oligotrophic , Moderate potential and negligible current algal productivity
Kalkfontein	0.059	26	-	-	-	Significant potential for algal productivity
Klipfontein	0.117	25	20.0	3	37	Eutrophic , Significant potential and current algal productivity
Klipvoor	0.777	22	104	21	78	Hypertrophic , Serious potential and current algal productivity
Knelloort	0.032	8	3.0	10	0	Oligotrophic , Moderate potential and negligible current algal productivity
Koppies	0.100	16	8.1	11	7	Oligotrophic , Significant potential and moderate current algal productivity
Kosterrivier	0.059	23	11.0	14	15	Mesotrophic , Significant potential and current algal productivity
Krugerdrift	0.135	8	-	-	-	Serious potential for algal productivity
Laing	0.485	16	4.2	8	0	Oligotrophic , Serious potential and negligible current algal productivity
Lindleyspoort	0.041	26	5.3	14	0	Oligotrophic , Moderate potential and negligible current algal productivity
Loskop	0.027	6	2.4	4	0	Oligotrophic , Moderate potential and negligible current algal productivity
Lotlamoneng	0.207	4	8.2	4	0	Oligotrophic , Serious potential and negligible current algal productivity
Luphephe	0.028	2	-	-	-	Moderate potential for algal productivity
Magoebaskloof	0.043	2	1.4	3	0	Oligotrophic , Moderate potential and negligible current algal productivity
Maguga	0.022	8	1.8	5	0	Oligotrophic , Moderate potential and negligible current algal productivity
Middelburg	0.031	22	1.3	21	0	Oligotrophic , Moderate potential and negligible current algal productivity
Middle Letaba	0.021	5	1.5	3	0	Oligotrophic , Moderate potential and negligible current algal productivity
Midmar	0.066	26	3.0	26	0	Oligotrophic , Significant potential and negligible current algal productivity
Misverstand	0.098	15	21.1	11	20	Eutrophic , Significant potential and current algal productivity
Modimola	0.142	43	13.21	7	2	Mesotrophic , Serious potential and moderate current algal productivity
Mutshedzi	0.023	2	3.3	4	0	Oligotrophic , Moderate potential and negligible current algal productivity
Nagle	0.027	24	9.5	24	0	Oligotrophic , Moderate potential and negligible current algal productivity
Nahoon	0.099	4	1.4	3	0	Oligotrophic , Significant potential and negligible current algal productivity
Neusberg Noord	0.057	15	20.92	15	15	Eutrophic , Significant potential and current algal productivity
Nooitgedacht	0.035	1	-	-	-	Moderate potential for algal productivity
Nsami	0.035	5	19.1	4	33	Mesotrophic , Moderate potential and significant current algal productivity
Nungwane	0.018	17	5.3	27	0	Oligotrophic , Moderate potential and negligible current algal productivity

Dam Name	Mean TP mg/L	n TP	Mean Annual Chlorophyll <i>a</i> (µg/l)	n Chl	Percent of time Chl <i>a</i> > 30 µg/l	Trophic status
Nwanedzi	0.030	3	8.75	1	0	Oligotrophic , Moderate potential and negligible current algal productivity
Nzhelele	0.015	1	-	-	-	Negligible potential for algal productivity
Olifantsnek	0.057	1	-	-	-	Significant potential for algal productivity
Orange River At Upington	0.060	16	17.35	5	0	Mesotrophic , Significant potential and negligible current algal productivity
Rietvlei	0.380	20	63.7	21	33	Hypertrophic , Serious potential and significant current algal productivity
Roodekopjes	0.059	13	16.8	8	30	Mesotrophic , Significant potential and current algal productivity
Roodeplaat	0.194	100	46.6	100	41	Hypertrophic , Serious potential and significant current algal productivity
Roodepoort	0.165	5	13.8	5	33	Mesotrophic , Serious potential and significant current algal productivity
Shongweni	0.059	22	24.7	22	36	Eutrophic , Significant potential and current algal productivity
Spitskop	0.092	20	24.9	3	40	Eutrophic , Significant potential and current algal productivity
Sterkfontein	0.026	35	2.1	17	0	Oligotrophic , Moderate potential and negligible current algal productivity
Taung	0.033	37	3.6	16	0	Oligotrophic , Moderate potential and negligible current algal productivity
Tzaneen	-	-	1.5	6	0	Oligotrophic , Negligible current algal productivity
Umtata	0.078	6	1.4	13	0	Oligotrophic , Significant potential and negligible current algal productivity
Umzinto	0.035	9	10.4	11	0	Mesotrophic , Moderate potential and negligible current algal productivity
Vaal Barrage	0.069	10	8.4	6	10	Oligotrophic , Significant potential and current algal productivity
Vaaldam	0.077	46	14.78	16	17	Mesotrophic , Significant potential and current algal productivity
Vaalkop	0.114	1	-	-	-	Significant potential for algal productivity
Vanderkloof	0.039	13	-	-	-	Moderate potential for algal productivity
Voelvlei	0.046	16	6.3	19	7	Oligotrophic , Moderate potential and current algal productivity
Vondo	0.022	10	2.5	6	0	Oligotrophic , Moderate potential and negligible current algal productivity
Vygeboom	0.012	1	-	-	-	Negligible potential for algal productivity
Welbedacht	0.076	10	11.7	8	12	Mesotrophic , Significant potential and current algal productivity
Witbank	0.040	21	16.0	22	25	Mesotrophic , Moderate potential and significant current algal productivity
Wriggleswade	0.039	7	-	-	-	Moderate potential for algal productivity